

Manipulating Data (Linear Transformations)

Use the list "PRES" that you transferred the other day to complete the following.

1. Create a histogram of the data on your calculator. Briefly describe the distribution (you do not need to draw a picture here). Put the data into L1.
2. Find the mean, median, IQR and standard deviation of this original set of data. (1-VAR STATS)

\bar{x} = _____ M = _____ s = _____ IQR = _____

3. Now take the data and **add 30** to each observation. (*Hint: use your lists to do the calculations for you! Put the data into L2*) Find the mean, median, IQR, and standard deviation of this new set of data. Also look at the histogram of this new set of data on your calculator.

\bar{x} = _____ M = _____ s = _____ IQR = _____

4. Which statistics changed? How? How does the histogram compare to the original histogram?

5. Now take the **original** set of data and **multiply each observation by 2.5**. *(put the data into L3)* Find the mean, median, IQR, and standard deviation of this new set of data. Also look at the histogram of this new set of data on your calculator.

\bar{x} = _____ M = _____ s = _____ IQR = _____

6. Which statistics changed? How? How does the histogram compare to the original histogram?

7. Now take the **original** set of data and multiply each observation by 5 and add 45. Find the mean, median, IQR, and standard deviation of this new set of data. Also look at the histogram of this new set of data on your calculator.

\bar{x} = _____ M = _____ s = _____ IQR = _____

8. Which statistics changed? How? How does the histogram compare to the original histogram?

doing something to all data
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center spread ?
• Multiplying an entire data set by a constant "b" changes....

center + spread

- How?

by $\times b$

- Examples:

Med, \bar{x} , IQR, s



x3 Ex:

| | |
|----------------|-----------------|
| $\bar{x} = 10$ | $\times 3 = 30$ |
| $M = 12$ | $\times 3 = 36$ |
| $s = 3$ | $\times 3 = 9$ |
| $IQR = 6$ | $\times 3 = 18$ |

← subtracting

- Adding a constant "a" to an entire data set changes...

center

- How?

by + a

- Examples:

μ, \bar{x}



Example:

I have a distribution with the following statistics:

$$\bar{x} = 25.3$$

$$M = 21$$

$$s = 3.1$$

$$\text{IQR} = 8$$

If I multiply each observation by 4 and add 6, what will the new Statistics be?

$$\bar{x} = 25.3 \times 4 + 6 =$$

$$M = 21 \times 4 + 6 =$$

$$s = 3.1 \times 4 =$$

$$\text{IQR} = 8 \times 4 =$$

*changing
units